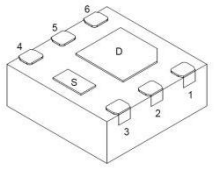
SZCJ

# DFNWB2x2-6L Plastic-Encapsulate MOSFET

**MJ** P-Channel Power MOSFET

**DFNWB2x2-6L**

1. DRAIN
2. DRAIN
3. GATE
4. SOURCE
5. DRAIN
6. DRAIN




## Key Performance Parameters

| $V_{BR(DSS)}$ | $R_{DS(on)}$TYP | $I_D$ |
|---|---|---|
| -40V | 32mΩ@-10V | -6A |
| | 44mΩ@-4.5V | |

## DESCRIPTION

This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance.

## FEATURES

- Battery switch
- Load switch
- High density cell design for ultra low $R_{DS(ON)}$

## APPLICATIONS

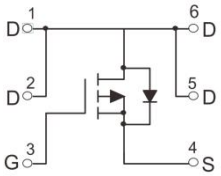
- SMPS and general purpose applications
- Hard switched and high frequency circuits
- Uninterruptible Power Supply

## MARKING




XXXXX = 040P04MJ
Solid dot = Pin1 indicator.
YY = Code.

## EQUIVALENT CIRCUIT




## ABSOLUTE MAXIMUM RATINGS ( $T_A$=25℃ unless otherwise specified )

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | -40 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current | $T_A$=25℃ | $I_D$⑥ | -6.0 | A |
| | $T_A$ =75℃ | | -4.6 | |
| Avalanche Current | | $I_{AS}$③ | -10.5 | A |
| Single Pulsed Avalanche Energy | | $E_{AS}$③ | 27.6 | mJ |
| Pulsed Drain Current | | $I_{DM}$①② | -24 | A |
| Power Dissipation | | $P_D$①⑥ | 2.6 | W |
| Operating Junction and Storage Temperature Range | | $T_J$,$T_{stg}$ | -55~+150 | ℃ |

## Thermal Characteristics

| Parameter | | Symbol | Value | | Unit |
|---|---|---|---|---|---|
| | | | Typ | Max | |
| Thermal Resistance from Junction to Ambient | t≤10s | $R_{\theta JA}$⑥ | 32 | 48 | ℃/W |
| | Steady State | | 60 | 90 | ℃/W |

# Typical Characteristics

## ELECTRICAL CHARACTERISTICS ($T_J$=25℃ unless otherwise specified)

### Static Characteristics

| Parameter | Symbol | Test Condition | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min | Typ | Max | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ =-250μA | | -40 | - | - | V |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$ =-40V,$V_{GS}$ =0V | $T_J$ =25℃ | - | - | -1.0 | μA |
| | | | $T_J$ =125℃ | - | - | -100 | |
| Gate-body leakage current | $I_{GSS}$ | $V_{GS}$ =±20V,$V_{DS}$ =0V | | - | - | ±100 | nA |
| Gate-threshold voltage | $V_{GS(th)}$ | $V_{DS}$ =$V_{GS}$, $I_D$ =-250μA | | -1.0 | -1.8 | -2.5 | V |
| Static drain-source on-sate resistance | $R_{DS(on)}$④ | $V_{GS}$ =-10V,$I_D$ =-5A | $T_J$ =25℃ | - | 32 | 40 | mΩ |
| | | | $T_J$ =125℃ | - | 52 | 65 | |
| | | $V_{GS}$ =-4.5V, $I_D$ =-5A | | - | 44 | 55 | |
| Forward transconductance | $g_{FS}$ | $V_{DS}$ =-5V,$I_D$ =-5A | | - | 17 | - | S |

### Dynamic Characteristics⑤

| | | | | | | |
|---|---|---|---|---|---|---|
| Input capacitance | $C_{iss}$ | $V_{GS}$=0V,$V_{DS}$=-20V, f =1MHz | - | 910 | - | pF |
| Output capacitance | $C_{oss}$ | | - | 73 | - | |
| Reverse transfer capacitance | $C_{rss}$ | | - | 66 | - | |
| Gate resistance | $R_g$ | f =1MHz | - | 5 | - | Ω |
| Total gate charge | $Q_g$ | $V_{GS}$=-4.5V,$V_{DS}$=-20V, $I_D$=-5A | - | 8.5 | - | nC |
| Total gate charge | $Q_g$ | $V_{GS}$=-10V,$V_{DS}$=-20V, $I_D$=-5A | - | 18 | - | |
| Gate charge at threshold | $Q_{G(th)}$ | | - | 1.7 | - | |
| Gate-source charge | $Q_{gs}$ | | - | 2.5 | - | |
| Gate-drain charge | $Q_{gd}$ | | - | 3.6 | - | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}$=-20V,$V_{GS}$=-10V, $I_D$=-5A, $R_g$=3Ω | - | 2.9 | - | ns |
| Turn-on rise time | $t_r$ | | - | 1.4 | - | |
| Turn-off delay time | $t_{d(off)}$ | | - | 25 | - | |
| Turn-off fall time | $t_f$ | | - | 7.5 | - | |

### Reverse Diode Characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| Drain-source diode forward voltage | $V_{SD}$④ | $V_{GS}$=0V, $I_S$=-5A | - | -0.85 | -1.2 | V |
| Continuous drain-source diode forward current | $I_S$① | | - | - | -6 | A |
| Pulsed drain-source diode forward current | $I_{SM}$①② | | - | - | -24 | A |

Notes:

①.Limited only by maximum temperature allowed.

②.$P_W$≤10μs, Duty cycle≤1%.

③.EAS condition: $V_{DD}$=-10V,$V_{GS}$=-10V, L=0.5mH, $R_g$=25Ω Starting $T_J$= 25℃.

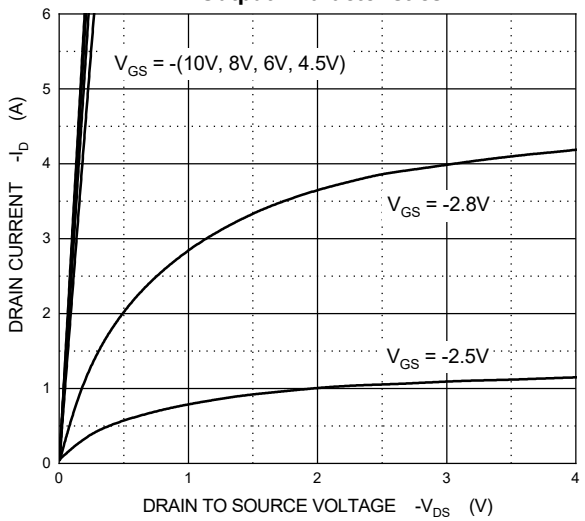
④.Pulse Test : Pulse Width≤380μs, duty cycle ≤2%.

⑤.Guaranteed by design, not subject to production.

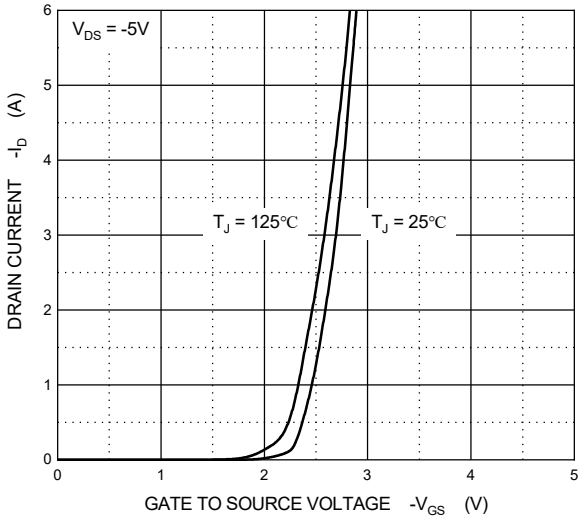
⑥.Device mounted on 1 $in^2$ FR-4 board with 2oz. double-sided Copper, in a still air environment with $T_A$=25℃.The current rating is based on the t≤10s thermal resistance rating.

# Typical Characteristics

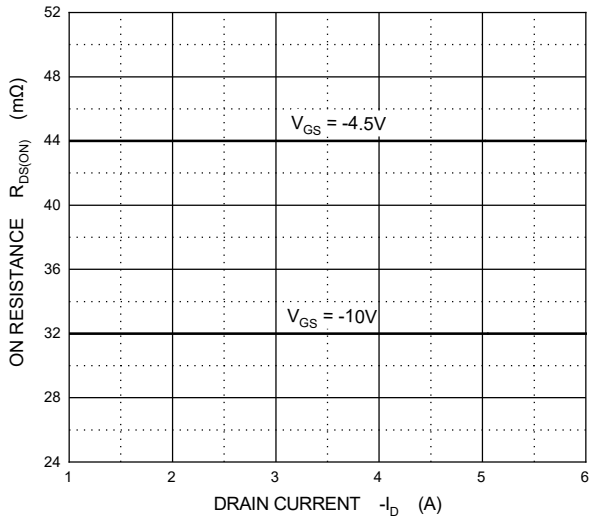
**Output Characteristics**



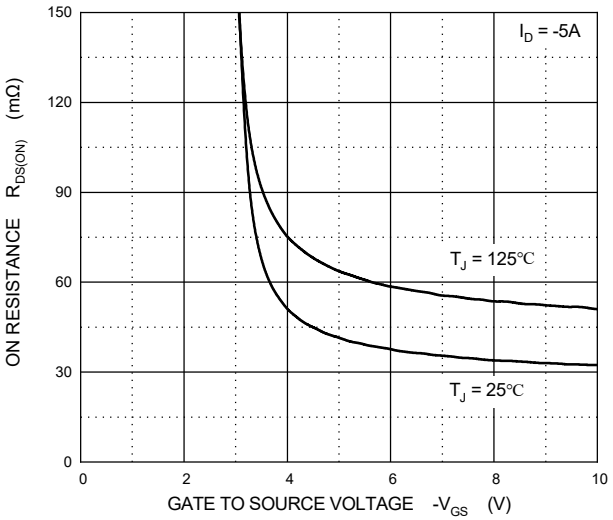

**Transfer Characteristics**



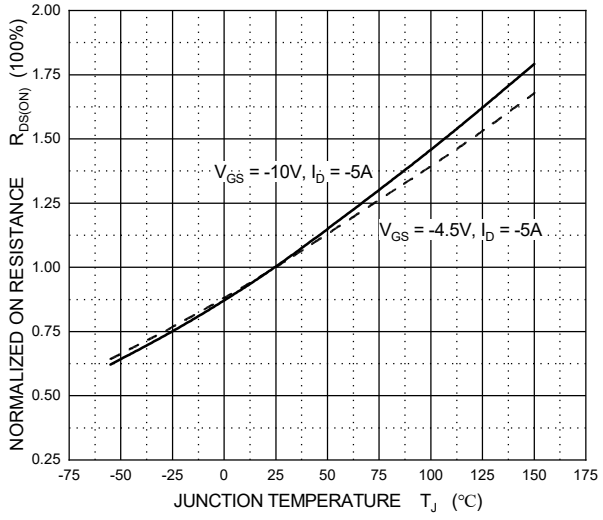

**On Resistance vs. Drain Current**



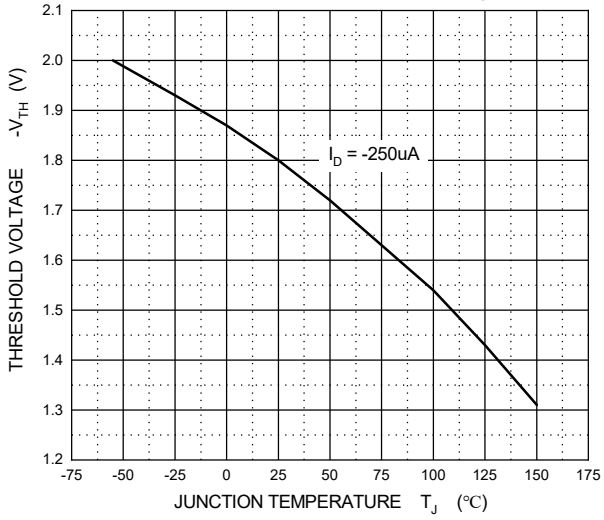

**On Resistance vs. Gate-Source Bias**




**On Resistance vs. Junction Temperature**

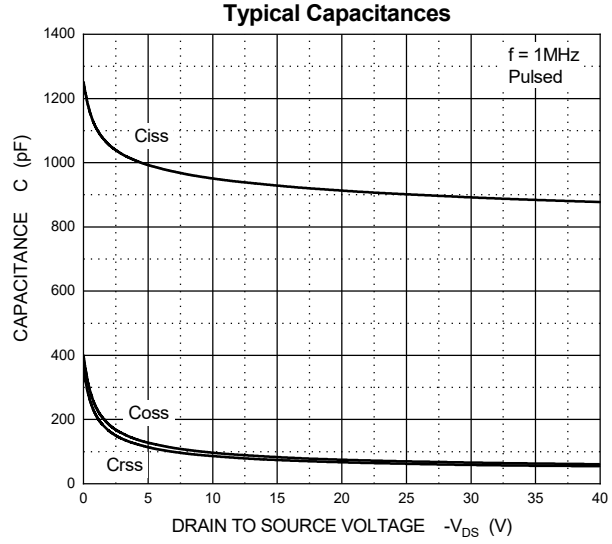



**Gate-Source Threshold Voltage**

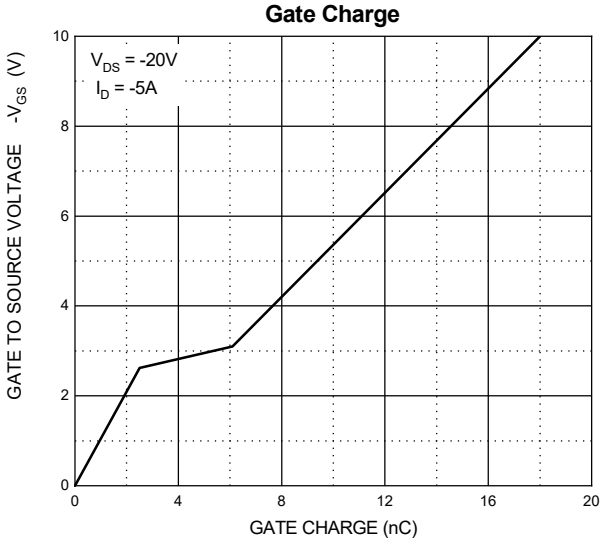


# Typical Characteristics

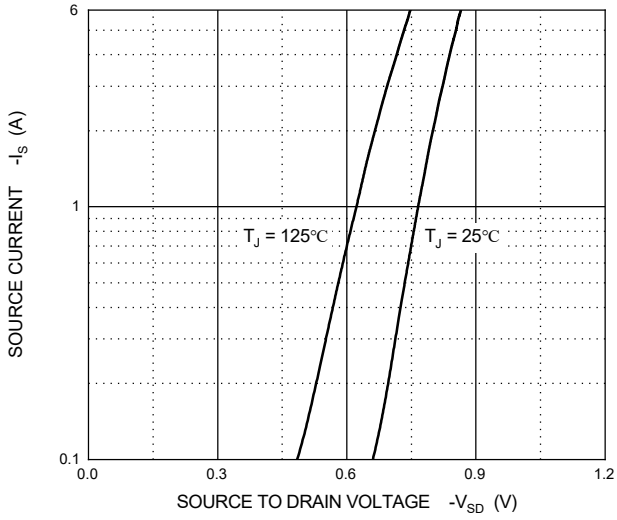
**Typical Capacitances**



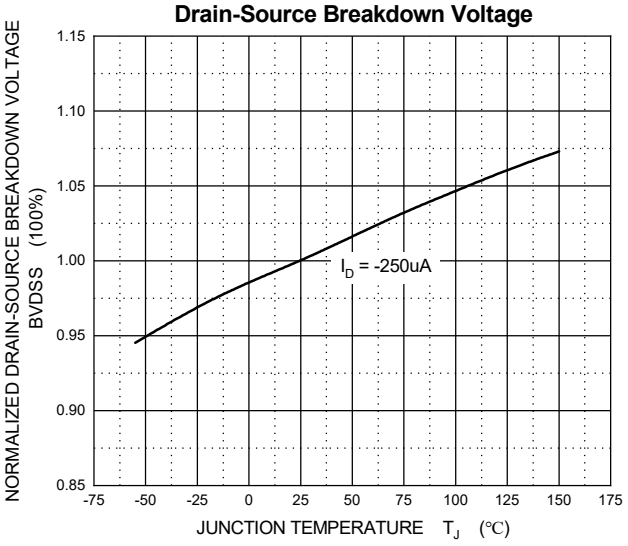

**Gate Charge**



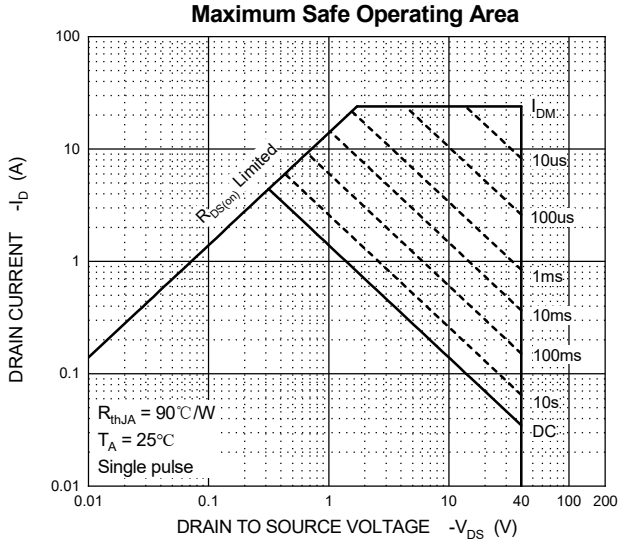

**Source-Drain Diode Forward Characteristics**



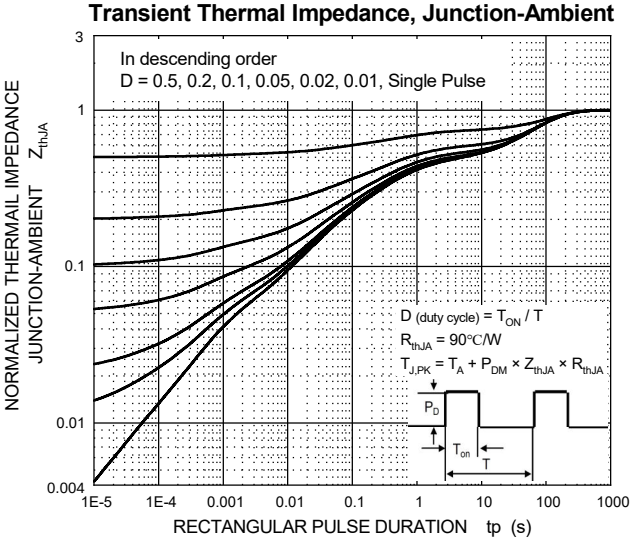

**Drain-Source Breakdown Voltage**




**Maximum Safe Operating Area**

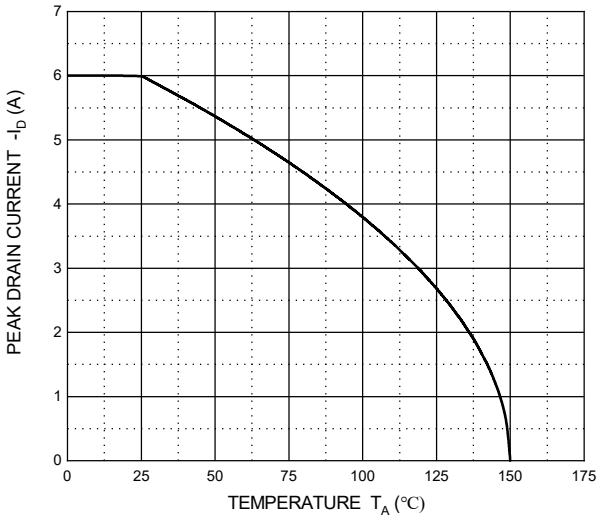



**Transient Thermal Impedance, Junction-Ambient**

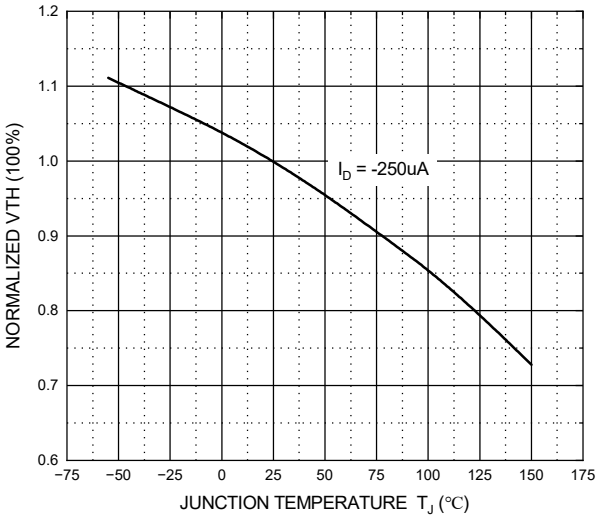


# Typical Characteristics

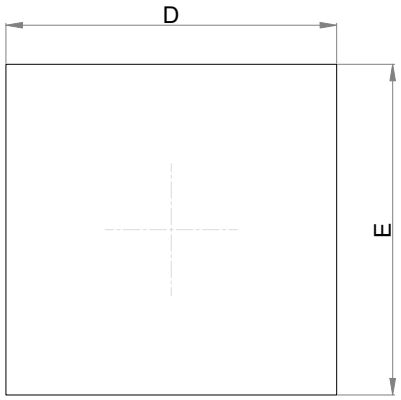
**ID vs. TA**



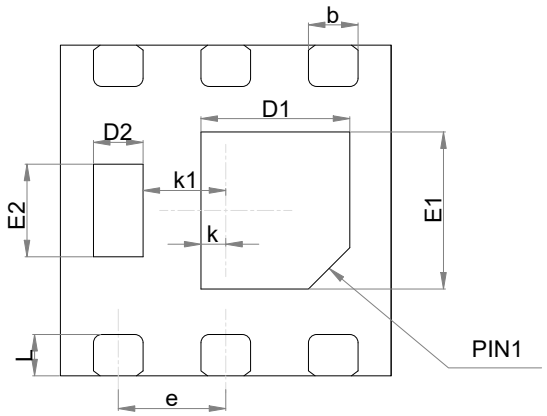

**Normalized Threshold Voltage vs. Junction Temperature**



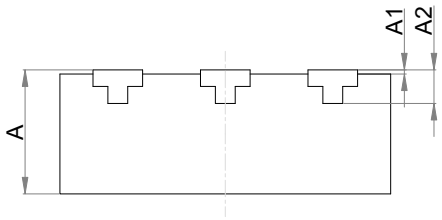
## DFNWB2x2-6L-B Package Outline Dimensions




Top View



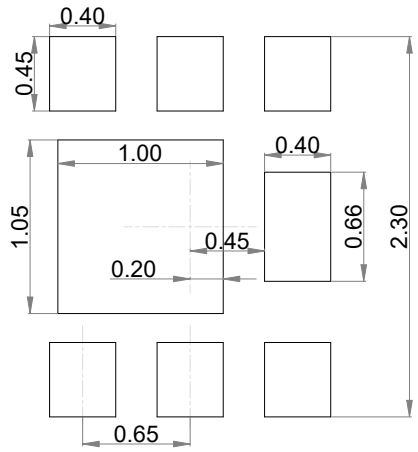

Bottom View




Side View

| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 0.70 | 0.80 | 0.028 | 0.031 |
| A1 | 0.00 | 0.05 | 0.000 | 0.002 |
| A2 | 0.203 REF. | | 0.008 REF. | |
| b | 0.25 | 0.35 | 0.010 | 0.014 |
| D | 1.90 | 2.10 | 0.075 | 0.083 |
| D1 | 0.85 | 0.95 | 0.033 | 0.037 |
| D2 | 0.25 | 0.35 | 0.010 | 0.014 |
| E | 1.90 | 2.10 | 0.075 | 0.083 |
| E1 | 0.90 | 1.00 | 0.035 | 0.039 |
| E2 | 0.51 | 0.61 | 0.020 | 0.024 |
| e | 0.65 BSC. | | 0.026 BSC. | |
| k | 0.15 REF. | | 0.006 REF. | |
| k1 | 0.50 REF. | | 0.020 REF. | |
| L | 0.20 | 0.30 | 0.008 | 0.012 |

## DFNWB2x2-6L-B Suggested Pad Layout

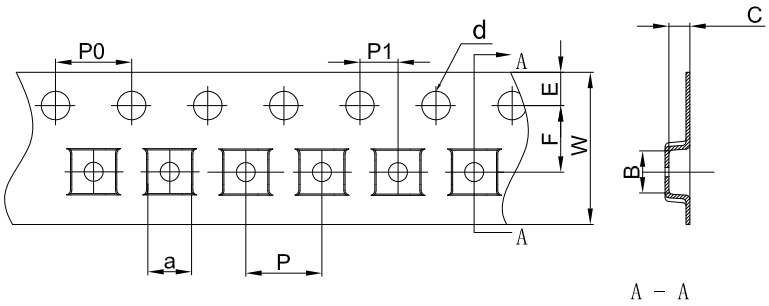



Controlling dimension：in millimeters.

NOTICE

SZCJ reserves the right to make modifications,enhancements,improvements,corrections or other changes without further notice to any product herein.SZCJ does not assume any liability arising out of the application or use of any product described herein.

## DFNWB2x2-6L Embossed Carrier Tape



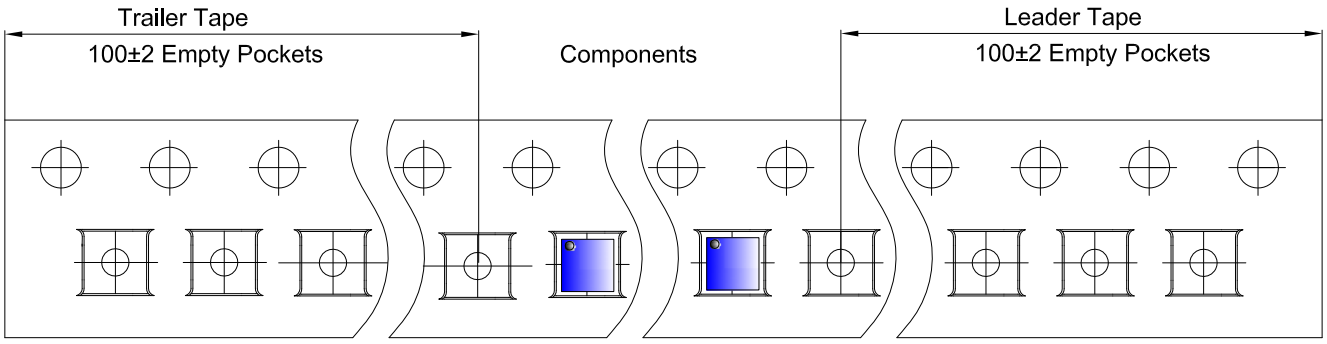

Packaging Description:

**DFNWB2x2-6L** parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 units per 7" or 18cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

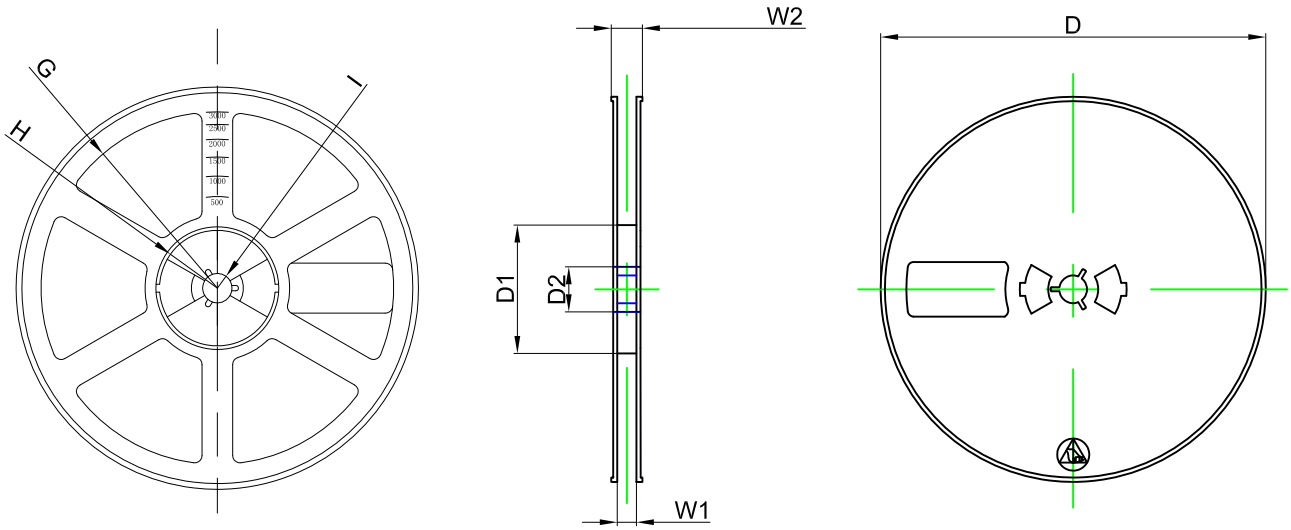
ALL DIM IN mm

| Dimensions are in millimeter | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Pkg type | a | B | C | d | E | F | P0 | P | P1 | W |
| **DFNWB2x2-6L** | 2.30 | 2.30 | 1.10 | Ø1.50 | 1.75 | 3.50 | 4.00 | 4.00 | 2.00 | 8.00 |

## DFNWB2x2-6L Tape Leader and Trailer




## DFNWB2x2-6L Reel




| Dimensions are in millimeter | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Reel Option** | **D** | **D1** | **D2** | **G** | **H** | **I** | **W1** | **W2** |
| 7" Dia | Ø180.00 | 60.00 | 13.00 | R78.00 | R25.60 | R6.50 | 9.50 | 13.10 |

| **Reel** | **Reel Size** | **Box** | **Box Size (mm)** | **Carton** | **Carton Size (mm)** |
|---|---|---|---|---|---|
| 3,000 pcs | 7 inch | 30,000 pcs | 210×208×205 | 120,000 pcs | 440×440×230 |